# Health Guidance:

## Tick Borne Disease Health Guidance

**July 12, 2018**

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The Missouri Department of Health & Senior Services (DHSS) is now using 4 types of documents to provide important information to medical and public health professionals, and to other interested persons:

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**Health Guidance**
**July 12, 2018**

**FROM:** **RANDALL W. WILLIAMS, MD, FACOG**
**DIRECTOR**

**SUBJECT:** **Tick-Borne Disease Health Guidance**

**Summary**
The Missouri Department of Health and Senior Services (DHSS) alerts healthcare providers that reports of tick-borne illnesses in 2018 are higher than the five-year median for the period 2013 through 2017. Many cases are still under investigation and case numbers are subject to change. Each year, Missouri experiences a substantial disease burden due to a variety of tick-borne illnesses including tularemia, ehrlichiosis, Rocky Mountain spotted fever (RMSF), and other spotted fevers. Other tick-borne illnesses have also been reported in Missouri, including Lyme disease and disease cause by Heartland and Bourbon viruses, but the number of cases identified for these diseases remains low.

**Tick-borne Rickettsial Disease (TBRD)**
Ehrlichiosis and RMSF are transmitted primarily through the bites of the lone star and American dog ticks, respectively. Tick-borne disease agents from the Rickettsiales order most frequently reported in Missouri are *Ehrlichia chaffeensis* (ehrlichiosis); *E. ewingii* (ehrlichiosis); and *Rickettsia rickettsii* and other Rickettsia species (RMSF and other spotted or eschar-associated illnesses).

In 2017, Missouri reported over 900 cases of TBRDs. As of July 9, 2018, reports of TBRDs are elevated compared to the five-year median for the period 2013 through 2017.

TBRDs can cause acute illness similar in initial presentation to many viral and bacterial febrile infections. Peak transmission of these tick-borne agents can continue into early August. Active transmission in Missouri typically is observed from late March through early October. TBRDs can cause severe illness and death in otherwise healthy adults and children. Diagnosis and treatment of these illnesses must be made on the basis of clinical signs and symptoms, and can later be confirmed using molecular and serological laboratory tests.

The standard for confirming a diagnosis of rickettsial infection is to perform an immunoglobulin G (IgG) indirect immunofluorescence antibody assay (IFA) on paired acute and convalescent phase specimens taken 2 to 4 weeks apart. During the first week of illness, when most patients seek medical care, antibodies are unlikely to be elevated. As the illness progresses past 7 days, however, the sensitivity of the IFA IgG assay increases in tandem with pathogen-specific antibody production. Because of its longevity and problems with cross-reaction, use of immunoglobulin M (IgM) antibody assays for TBRDs should not be used as a stand-alone method for diagnosis of these conditions.

Polymerase chain reaction (PCR) tests can be used to diagnose ehrlichiosis during acute illness. This test is less sensitive for detecting RMSF infection and is not considered standard of care. While treatment should not be delayed, antibiotic use will reduce the sensitivity of PCR testing. To minimize the risk of obtaining false negatives, specimens should ideally be collected prior to administration of doxycycline.

Delay in diagnosis and treatment is associated with more severe illness and death. Case fatality rates for immunocompromised patients are characteristically higher than rates reported for the general population. Healthcare providers should keep a high index of suspicion for TBRD and include TBRD in the differential diagnosis of summertime febrile patients with known or potential tick exposure.

**Tularemia**

Tularemia is caused by the highly infectious bacterium, *Francisella tularensis*. Missouri lies within a North American focal area of human tularemia disease that encompasses our borders as well as the states of Arkansas, Oklahoma, and Kansas. Two subspecies are known to cause human illness: *F. tularensis* subsp. *tularensis* (Type A) and *F. tularensis* subsp. *holarctica* (Type B). Both types have been isolated from Missouri patients; Type A typically presents with more virulence and commonly occurs naturally in rabbit and rodent populations. In addition to tick-bite transmission, tularemia is contracted through other means, including bites from infected animals, ingestion of contaminated water and undercooked meat, inhalation of aerosolized soils or blood, and direct contact with mucous membranes and broken skin. In 2017, Missouri reported 35 cases of tularemia. As of July 9, 2018, reported tularemia cases in Missouri are comparable to previous years.

Severity of illness among the various forms of tularemia can range from mild to life threatening. Clinical presentation of tularemia is influenced by the route of exposure. Symptoms generally start as a flu-like illness with lymphadenopathy. Fever, sometimes high, is likely to accompany all forms. Because the symptoms of tularemia can be easily mistaken for other illnesses, diagnosis can be challenging.

Laboratory diagnosis of tularemia can be made by isolating *F. tularensis* from swabs/scrapings of lesions, blood, sputum, aspirates, biopsy specimens, or other exudates. Under State of Missouri communicable disease rules, isolates that screen positive for *F. tularensis* are to be submitted to the State Public Health Laboratory (SPHL) for confirmatory testing (19 CSR 20-20.080 Duties of Laboratories). Material submitted to the SPHL should be prepared as pure inoculated culture slants.

Serological diagnosis can be made through detection of antibodies to *F. tularensis* using tube agglutination or microagglutination. Confirmation of a tularemia diagnosis by serology requires a four-fold or greater change in antibody titer between appropriately timed acute and convalescent specimens. Antibody tests are most useful in the second week of infection. Some cross-reactivity may occur with *Brucella* spp., *Legionella* spp., and *Yersinia* spp., usually at low titers. Tularemia can also be diagnosed using a PCR test. A recent study by DHSS and the Centers for Disease Control and Prevention (CDC) demonstrated that despite being endemic in Missouri, tularemia diagnosis by medical providers is often delayed.

Without treatment, the tularemia case fatality rate can be as high as 30%. Prompt treatment with antibiotics can reduce the likelihood of complications related to illness. Antibiotics used to treat tularemia include streptomycin, gentamicin, doxycycline, and ciprofloxacin. Treatment usually lasts 10 to 21 days depending on the stage of illness and the medication used. With treatment, the case fatality rate falls to 1-3%.

**Lyme disease**

Lyme disease is the most common tick-borne disease in the United States. The majority of North American cases of Lyme disease are diagnosed in the Northeast and upper Midwest of the United States. Healthcare providers are reminded that public health disease reporting criteria used to monitor the epidemiology of Lyme disease are not intended to serve as a diagnostic standard for this condition.

In 2017, Missouri reported 12 cases of Lyme disease. Each of these cases was evaluated against public health reporting criteria. Some of Missouri's reported cases were exposed during travel to a Lyme disease-endemic area, became ill, and were tested upon return. Other cases were counted as a Lyme disease case because a physician diagnosed Lyme disease and laboratory evidence suggested recent or past exposure to *Borrelia burgdorferi*, the causative agent of Lyme disease. The latter cases present surveillance challenges for DHSS because a single serology cannot demonstrate seroconversion from IgM antibodies to IgG antibodies. It is important to note that Lyme bacteria have never been isolated from any of Missouri's cases.

Healthcare providers should be cognizant that criteria used to assess a suspected case of Lyme disease for public health reporting are not as rigorous as peer-reviewed diagnostic criteria. For the diagnosis and treatment of patients for whom Lyme disease is a consideration – but for whom there is also a degree of uncertainty – the national reporting criteria lacks specificity. This is a concern in states like Missouri, where *B. burgdorferi* does not appear to be endemic. Specific differences between the two sets of criteria include:

- Diagnostic recommendations for appropriately timed acute- and convalescent-phase serology using the accepted two-tiered algorithm to demonstrate seroconversion;
- Recognition of the poor performance (e.g., specificity) of IgM assays for Lyme disease, particularly when ordered for patients lacking objective symptoms of Lyme disease; and
- The necessity of ruling out other etiologies through an examination of laboratory or imaging abnormalities that might suggest an undiagnosed condition or process distinct from Lyme disease.

As of July 9, 2018, reported cases of Lyme disease are above the five-year median for the period 2013 through 2017. Many of these cases are still under investigation and subject to change. Over time, Missouri public health surveillance data have suggested that the risk of locally-transmitted Lyme disease is low. In acute illness cases where presentation includes an erythema migrans (EM) lesion and other characteristic symptoms (headache, fatigue, arthralgias, and objective periods of

arthritis of less than two weeks duration), but no out-of-state travel history, diagnostic uncertainty may be resolved using both acute- and convalescent-phase (i.e., two weeks after the acute-phase) serum samples tested using the two-tier testing algorithm.

**Heartland and Bourbon Viruses**

In the last decade, two previously unknown viruses have been found in Missouri patients. There is evidence to suggest that both viruses are transmitted by the bite of an infected tick. DHSS is working with the CDC to gather more information about how people get infected, which types of ticks or other insects may carry the viruses, and how to prevent illness from occurring.

To date, more than 30 cases of Heartland virus disease have been identified in nine Southeast and South Central states (e.g., Indiana, Kentucky, North Carolina, Georgia, Tennessee, Missouri, Arkansas, Oklahoma, and Kansas). Fewer cases of Bourbon virus disease have been identified, but the geographic distribution of known cases is similar to Heartland virus.

Patients with Heartland or Bourbon virus disease identified to date have had a flu-like illness with high fever, fatigue, anorexia, and diarrhea. Patients were found to have leukopenia and thrombocytopenia on presentation to the hospital and later developed elevated liver transaminases. Several patients required hospitalization and some died due to complications from their infection with either Heartland virus or Bourbon virus. The majority of patients with Heartland or Bourbon virus disease, however, have recovered.

For more information on tests available for Heartland or Bourbon viruses, please call the Office of Veterinary Public Health at (573) 751-6113 during regular business hours, or call the DHSS Emergency Response Center at (800) 392-0272 after regular hours or on weekends. All requests for testing will be evaluated by a DHSS or CDC epidemiologist.

**Tick Bite Prevention**

The best way to avoid getting a tick-borne disease is to prevent tick bites from occurring. Encourage patients to take the following simple steps to protect themselves and their families:

<u>Clothing</u>

- Wear light colored clothing to make it easier to spot crawling ticks. When possible, tuck clothing in to prevent ticks from crawling under clothing and attaching to the skin.
- Clothing worn outdoors can be placed in a dryer on high heat for at least 10 minutes to kill any ticks on the clothing. If the clothing is damp, additional time may be needed.
- If clothing needs to be washed immediately, wash in hot water and then dry on high heat until no longer damp.

Repellent use

- Use an insect repellent on exposed skin and clothing that contains at least 20% DEET, picaridin, or IR3535. Protection time will depend upon the repellent ingredient and concentration. Repellent should always be applied according to package instructions.
- The American Academy of Pediatrics and CDC recommend use of insect repellent containing up to 30% DEET for infants over 2 months of age.
- Clothing, boots, daypacks, and camping gear can be treated with a product called permethrin. Items should be sprayed and allowed to dry completely before use. Permethrin-treated items will remain effective for multiple washings.
  - Permethrin should only be applied to clothing or gear, not to skin.
  - Do not apply to clothing while it is being worn.
  - Remember to apply insect repellent to exposed skin.

Tick checks

- After spending time in tick infested areas, do a thorough check for ticks.
- Showering soon after coming indoors is also recommended to more easily locate crawling or attached ticks.
- Remove ticks as soon as possible.

**For More Information:**

1. Biggs HM, Behravesh CB, Bradley KK, et al. Diagnosis and Management of Tickborne Rickettsial Diseases: Rocky Mountain Spotted Fever and Other Spotted Fever Group Rickettsioses, Ehrlichioses, and Anaplasmosis — United States. MMWR Recomm Rep 2016;65(No. RR-2):1–44. DOI: http://dx.doi.org/10.15585/mmwr.rr6502a1
2. Centers for Disease Control and Prevention. (2018). Tickborne Diseases of the United States: A Reference Manual for Health Care Providers. Fifth edition. Retrieved from https://www.cdc.gov/ticks/tickbornediseases/TickborneDiseases-P.pdf.
3. Weber IB, Turabelidze G, Patrick S, Griffith KS, Mead PS, Kugeler KJ. Clinical recognition and management of tularemia in Missouri: a retrospective chart review of 121 cases. Clin Infect Dis. 2012 Aug 21. Retrieved from https://academic.oup.com/cid/article/55/10/1283/323868.

# Health Guidance:

## Acute Flaccid Myelitis (AFM)

**November 26, 2018**

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**Health Guidance**
**November 26, 2018**

**FROM:** **RANDALL W. WILLIAMS, MD, FACOG**
**DIRECTOR**

**SUBJECT:** **Acute Flaccid Myelitis (AFM)**

**Summary**
The Missouri Department of Health and Senior Services (DHSS) in collaboration with local public health agencies (LPHAs) in Missouri are working closely with the Centers for Disease Control and Prevention (CDC) to increase awareness of, and investigate persons suspected of having, acute flaccid myelitis (AFM). Healthcare providers are encouraged to maintain vigilance for cases of AFM among all age groups of patients and continue to promptly report all cases to the relevant LPHA, or to DHSS. The purpose of this document is to provide guidance for healthcare providers on reporting AFM, update current clinical information, and describe clinical specimens needed from all patients suspected of having AFM. The prompt reporting and investigation of AFM cases will help public health authorities monitor the occurrence of AFM in Missouri and allow better understanding of the factors associated with this illness.

**Background**
AFM is a rare condition that affects the nervous system, specifically the spinal cord, causing weakness in one or more limbs. AFM or neurologic conditions like it have a variety of causes such as viruses and environmental toxins. Since 2014, CDC has received information on a total of 440 confirmed cases of AFM from across the United States; most of the cases have occurred in children. So far in 2018, 116 confirmed cases of AFM have been reported from 31 states, which includes 1 confirmed case from Missouri. The evaluation and case classification of additional patients under investigation (PUIs) for AFM is ongoing. Even with an increase in cases since 2014, AFM remains a very rare condition. Less than one in a million people in the United States get AFM each year.

AFM is characterized by sudden weakness in one or more arms or legs, along with loss of muscle tone and decreased or absent reflexes. In addition, in some cases cranial nerve dysfunction may occur resulting in facial weakness, difficulty swallowing, or drooping of the eyes. In some patients, in addition to limb weakness, bladder or bowel incontinence has been reported. Numbness or tingling is rare in people with AFM, although some have reported pain in their arms or legs. AFM can lead to respiratory failure, and in rare cases the illness can be fatal. AFM can be difficult to diagnose because it is clinically similar to other neurologic diseases, like transverse myelitis and Guillain-Barre syndrome (GBS). AFM is usually characterized by chronically depressed reflexes, and sensory findings are not as discrete as in transverse myelitis, or progressively ascending as in GBS. Magnetic resonance imaging (MRI) lesions in AFM patients are more often confined to the gray matter than lesions associated with transverse myelitis, and can also include nerve root enhancement and cranial nerve involvement.

**Recommendations**
Healthcare providers should continue to promptly report all patients that meet the clinical criterion for AFM (acute onset of flaccid limb weakness) to their LPHA, or to

DHSS at 573/751-6113 or 800/392-0272 (24/7). Patients suspected of having AFM should be reported regardless of whether they test positive or negative for an enterovirus. Clinical information, test results, and biological specimens from PUI for AFM will be requested. DHSS will help coordinate the submission of the information and biological specimens to CDC for evaluation and testing. The information submitted to CDC will be reviewed by several subject matter experts, and a case classification will be made in accordance with the nationally standardized case definition for AFM (https://www.cdc.gov/acute-flaccid-myelitis/hcp/case-definition.html). The review and final case classification will typically be completed within 4 weeks from submission. The case classification is used for surveillance purposes and should not interfere with the differential diagnosis or final clinical diagnosis or treatment of the patient.

The clinical information, test results, and biological specimens requested for any PUI for AFM include the following **regardless of specific laboratory or MRI results**:

***Clinical Information and Test Results:***

- AFM patient summary form (https://www.cdc.gov/acute-flaccid-myelitis/hcp/data.html)
- Admission and discharge notes
- Neurology and infectious disease consult notes
- MRI reports AND images
- Complete vaccination history, and
- Laboratory test results.

***Laboratory Testing***: Healthcare providers should collect the following specimens from PUI for AFM as early as possible in the course of illness, preferably on the day of onset of limb weakness. DHSS and/or the LPHA will assist in coordinating the submission of specimens to CDC for testing. Specimens to collect include:

- CSF; and
- Serum; and
- A nasopharyngeal (NP) or oropharyngeal (OP) swab; and
- Stool

***Please note: Collection of stool is required for AFM surveillance. Two stool specimens should be collected at least 24 hours apart early during the course of illness to rule out poliovirus infection.***

Pathogen-specific testing for diagnostic purposes should continue at the hospital or the Missouri State Public Health Laboratory (MSPHL).

***Questions should be directed to DHSS' Bureau of Communicable Disease Control and Prevention at 573/751-6113 or 800/392-0272 (24/7).***

***Additional Information and Guidance from CDC:***

- AFM Surveillance: https://www.cdc.gov/acute-flaccid-myelitis/index.html
- Council of State and Territorial Epidemiologists (CSTE) Standardized Case Definition for AFM: https://www.cdc.gov/acute-flaccid-myelitis/hcp/case-definition.html
- AFM Investigation: https://www.cdc.gov/acute-flaccid-myelitis/afm-surveillance.html
- Information and Guidance for Clinicians and Health Departments: https://www.cdc.gov/acute-flaccid-myelitis/hcp/index.html
- AFM Resources and References: https://www.cdc.gov/acute-flaccid-myelitis/references.html